INFORMATIONAL MEETING

NASA/JET PROPULSION LABORATORY

20 July 1999

ATTENDEES:

Richard Atwater, Bookman-Edmonston Eng.
Inna Babbitt, City of Pasadena
Brad Boman, City of Pasadena
Charles L. Buril, JPL
Stefan Cajina, DOHS
Alex Carlos, RWQCB-LA
Mark Cutler, Foster Wheeler
Richard Gebert, DTSC
Robert J. Hayward, LAWC/RBMB
Rufus Hightower, City of Pasadena
Vitthal Hosangadi, Foster Wheeler
Shah Kwan, City of Pasadena
Mark Losi, Foster Wheeler
Manny J. Magana, Raymond Basin
Chis Nagler, CDWR
Judith A. Novelly, JPL
Ron Palmer, Raymond Basin
Mark Ripperda, U.S. E.P.A.

ATTENDEES: (cont'd.)

Peter Robles, Jr., NASA

Ron Palmer, Raymond Basin

Gary Takara, City of Pasadena

Vera M. Vecchio, DOHS

Reported by: Louise K. Mizota, CSR 2818

Pasadena, California

July 20, 1999

10:35 A.M.

BURIL: Let's go ahead and get the preliminaries understood here.

Louise has quite a challenge trying to keep track of everybody here, so I'm going to ask everyone to introduce themselves, where you're from, and we'll proceed without Pete for the time being. He told me he's on a phone call. He'll be in in just a couple minutes. I'll start.

BURIL: Chuck Buril, JPL.

HAYWARD: Bob Hayward from Lincoln Avenue Water Company and the Raymond Basin Management Board.

CUTLER: Mark Cutler with Foster Wheeler.

RIPPERDA: Mark Ripperda from the U.S. E.P.A.

GEBERT: Richard Gebert, DTSC.

CARLOS: Alex Carlos, Regional Board.

MAGANA: Manny Magana, Raymond Basin.

PALMER: Ron Palmer, executive officer of Raymond Basin.

VECCHIO: Vera Vecchio, State Health Department, Metropolitan District.

ATWATER: Rich Atwater, consultant to Raymond

Basin.

KWAN: Shan Kwan, City of Pasadena.

BABBITT: Inna Babbitt, City of Pasadena.

NAGLER: Chris Nagler, Department of Water Resources.

NOVELLY: Judy Novelly, JPL.

TAKARA: Gary Takara with Pasadena Water & Power.

BOMAN: Brad Boman, Pasadena Water & Power.

LOSI: Mark Losi, Foster Wheeler.

HOSANGADI: Vitthal Hosangadi, Foster Wheeler.

CAJINA: Stefan Cajina, Department of Health Services

BURIL: Okay. Great. Thank you all.

Because we have got kind of a large group, I'm going to ask everyone to please try and not interrupt another person while you're talking because we could get into a real mess, in which case we have a real hard time keeping track of what's being said.

So the agenda is reasonably short, and we probably term this more of an introductory meeting more than anything else and certainly it's my hope that we'll be discussing certain of these things well off into the future here as far as greater

detail and working together on a variety of issues.

The first thing I'd like to do is to point out the agenda. I've got three items on this. The first one is DHS Policy 97-005. That is something that I was hoping that Vera might be able to walk is through just a little bit. We did that some time ago, and I think maybe getting somewhat kind of thing with both NASA, JPL and water purveyor folks in the room so if any questions do come up we have opportunity to get a standard answer that we can all use.

I think {SREPB/} a Table that I'll pass out to you when we get to it. This is a Table of Remedial Alternatives that we are considering. And we've basically got just about everything but the kitchen sink in here. You can see how we've broken this down, and you can see some of the alternatives that would certainly involve some kind of participation by the water purveyors.

Last of all, I know that at the last Raymond Basin Management Board meeting we got some draft comments from Ron and from Rich Atwater, and I wanted to take the opportunity to be sure that they had a chance to voice their concerns with regard to things in the RI report and whatever discussion that

might come about as a result of that we can deal with at that time.

Vera, if you would, it would be helpful for us just to get kind of the overview and how you understand this policy might apply to the JPL site and so forth.

VECCHIO: Okay. Have all of you seen a copy of the 97-005? Everybody has seen this document at one point or another. Okay. All right.

I just want to give a little bit of the philosophy of the Department. And the Department's basic philosophy is if you have another source of supply that is a better quality, it is in the best interest of the utility not to use a contaminated supply. In L.A. County sources of supply are very limited. And as a result, this particular policy was developed.

(Mr. Robles entered the meeting room.)

VECCHIO: And it is strictly a guidance document for staff to go through the process of evaluating the water quality, the treatment processes, treatability of the chemicals and whether or not the water that is going to be served to the customers is safe, wholesome and potable.

So that's basic -- the philosophy here.

So how does JPL fit in? And how does City of Pasadena fit in and how does Lincoln Avenue fit in? Okay.

I think it's probably pretty well known that the plumes that have affected the City of Pasadena's wells and Lincoln Avenue's wells have come off of the JPL site from past practices. Treatment has been provided for the volatile organic chemicals that one of the new chemicals that has come up is perchlorate. And there are other chemicals that have come up, and that's MDMA. And I believe at this point there is no MDMA in the wells on site or off site

BURIL: That is correct.

VECCHIO: Okay. We are not knowledgeable at this point as to what other chemicals exist besides the TCE, the PCE, the carbon tet, the 1, 1, DCE and perchlorate. That is going to be part of the process called the raw water characterization.

And after the raw water characterization is done, then each of the chemicals have to be looked at in terms of treatability. If they are treatable by the type of treatment system proposed, then we will accept that particular water supply as a domestic water source.

There is about 10 different processes that one has to go through. A report has to be generated to comply with this policy, going through each one of these steps, whether it is supplied to us by the City of Pasadena or by the utility that takes that water, okay, or whether it's supplied to us by JPL, it is not of concern to us. Okay?

But we at this point have to identify that a water system is going to take this. Otherwise, we cannot be involved with this project because everything in terms of our time is all billable, and if we cannot identify a water system, then we cannot work on this project. And, therefore, the project cannot proceed. Okay? That's number one item.

The other item is, once you've gone through this process, there has to be a public hearing. And the public hearing is specifically to present the findings of 97-005 for the Department to make an evaluation that if the water were treated with a treatment system proposed --

(Telephone interruption.)

BURIL: Rufus is coming as well. We didn't know he was coming.

(Discussion held outside the record.)

VECHHIO: Once the public hearing is held and

the customers, whoever is going to receive that water, accepts that water, then we will issue a permit. The permit must be issued to a water system.

(Ms. Novelly left the meeting room.)

VECHHIO: If it is not issued to a water system, then we have to make JPL a water system. Okay? Those are the conditions

BURIL: Can you stand the competition?

ROBLES: Can I have a seat on the Raymond Basin ?

VECCHIO: So basically, then, you have to fight for the water rights.

PALMER: That's settled already. That's not a problem.

VECCHIO: We proceeded in this manner with a number of their operable units. Burbank is in operation. Lockheed chose not to be a water system. They supply all the information to City of Burbank. City of Burbank provides that information to us. Burbank is, however, going to take over the operations of the Operable Unit so Lockheed will phase out.

In the case of the Glendale Operable Unit Glendale has taken operation right up front

BURIL: Okay.

VECCHIO: Their arm was twisted to do it, but they have taken on the operation.

So we need to identify, first of all, that extraction is going to occur, it is going to be delivered to a water system and if it is not going to be delivered to a water system, then we don't need to go through this process.

(Ms. Novelly entered the meeting room.)

VECCHIO: Then we will go through the Regional Board process review and the Regional Board then defines the extraction and discharge. But if it's going to be used for a domestic water source, we need to know who it's going to be.

ROBLES: Can I ask just one question? If, scenario, pump it out, inject it back into the aquifer, would that require permitting?

VECCHIO: That would require a Regional Board permit.

ROBLES: Okay.

BURIL: Can you describe a little bit more about this raw water --

VECCHIO: Characterization?

BURIL: Yes.

VECCHIO: Well, we would require you to look at

all of the chemical constituents that had been listed by the EPA. All of those chemicals that are on the Prop 65 list, potential chemicals that are coming down the pike that the EPA is going to regulate. You look at all the list of the chemicals that you have used on site that may not be on these particular lists, and you look at the Title 22 lists.

ROBLES: And also any chemicals that you are identifying down the line as well.

VECCHIO: Right. Right.

ROBLES: Okay.

VECCHIO: So there's a number of lists that you have to come from.

And then there is also a -- they have various different analyses that can be performed where peaks just come up. And you have to identify those peaks. So that's sort of what we call sort of a tick analysis.

ROBLES: Now, just a question. Does the accumulated risk, is it individual added together, or is it a look at the dynamics of the chemical interaction between all these chemicals? That's the thing that has always been fuzzy when I read this document.

VECCHIO: The risks are associated with once you've treated it, once you have treated the chemicals, are there any potential risks.

ROBLES: After treatment.

VECCHIO: After treatment. Not before treatment. Because before treatment there's all kinds of risks involved. It's after treatment.

For example, can you treat down to -- can you treat down to ND? If you can't, if you have three or four chemicals, what would be the effects if you couldn't treat down to ND?

CAJINA: Something else that's come up, it's not a concern here yet, fortunately, since there hasn't been any MDMA detected, but if you have a constituent like MDMA where you have basically the nondetect level, the reporting --

ROBLES: The MCL level.

CAJINA: It is actually higher than the MCL. So we're dealing in that case with a DLR of about 30 and the MCL is, what, 2?

VECCHIO: 3.

CAJINA: It's 2 or 3.

VECCHIO: PPTs.

CAJINA: Right. Parts per trillion. What you have to accept is that if it really can't be

measured any lower than that, you might prove that your treatment can treat to ND. But if lab techniques improve and we're able in the future to determine its presence somewhere between the DLR and the actual MCL you're out of business again. So it's worth taking a good look at.

ROBLES: But the key question is, because I don't know of any quantifiable mechanism for analyzing the synergistic risk of cumulated plumes. I know that we have the risk for X, Y, Z chemical all the way to nondetect.

VECCHIO: Right.

ROBLES: But I have never seen yet anywhere, and I have been frantically searching the Internet.

VECCHIO: You're not going to find it.

ROBLES: I've been looking for a non-existent needle in a huge haystack.

VECCHIO: You're not going to find it. Because there are so many different chemicals, we look at the analyzing -- if you were to take this supply, treat it down to ND and you compare it with the existing supply, let's say you were going to supply it to City of Pasadena. If you were to compare constituent by constituent, how are you going to look? Okay. If you come up to NDs, okay, and the

City of Pasadena's water is ND, there's no risks here. Okay.

But if you come up with two, they have ND, then you have to show the comparative risk over a lifetime, which is what most of these constituents are.

ROBLES: Is there accepted methodology that you guys approve of?

VECCHIO: For?

ROBLES: For any constituent chemical. For analysis, for determining the risk. What is the health risk assessment methodology?

VECCHIO: Well, we would have to go through OEHHA, which is our state -- for example, let's say you come up with a chemical that has never been identified before. We would pass that information on up to our technical people up in Sacramento. They would go to OEHHA and OEHHA would come up with either a couple of tough goals or positional action matter.

BURIL: Could you spell us what OEHHA stands for, please.

CAJINA: Office of Environmental Health and Hazardous Assessment.

VECCHIO: Assessment, yeah.

RIPPERDA: Can I ask a question? You need billable for review. You said you need to bill a water system, but in the feasibility study of a Superfund cleanup frequently you're looking at a bunch of different things. Like it might be in JPL's interest to be looking at this even if hey don't know for a fact they're going to do it.

So is there a way to set up an interagency agreement where you bill them instead of a water agency?

VECCHIO: Yes. That's what we usually do.

ROBLES: The only thing I was thinking there is that the State gets its 1 percent. How they split it up is their business. Right now it's being split up by them TOO two. We can only pay 1 percent

BURIL: There is a cap of 1 percent --

ROBLES: To the State

BURIL: -- to the State for total reimbursement. That's what he's referring to. At this time I don't think we're anywhere near 1 percent.

VECCHIO: 1 percent of what?

BURIL: Of the total cost of the project.

VECCHIO: Total cost. So if it's a $30 million project, so we're looking at --

BURIL: $300,000.

ATWATER: Peter, look at the total cost issue. You have budget, maybe, but you don't know what --

ROBLES: But we have never even come close to 1 percent.

ATWATER: Sure.

ROBLES: There's still room for you to bill us.

BURIL: I don't think there's an issue here, really. It's just kind of a heads up.

RIPPERDA: In the risk assessment you mentioned like an unknown chemical going up to have this OEHHA compare it for review. But if it's just like known chemicals, like perchlorate, maybe they get it down to one, and they have a few other chemicals whose -- they're known chemicals, there's established MCLs, would they then just follow a very standard risk assessment?

VECCHIO: Right. Well, you don't even have to do a risk assessment. You have to -- this is a very hard issue to -- most of the water systems their dealing with they're having a hard time grappling with this. And it is a hard issue.

Because basically what you're doing is if you were to -- basically what you do is you compare the water that's going to be treated with the water that's being distributed out in the distribution.

How do the two compare? Is it going to be less hazardous, or is it going to be more hazardous? That's basically what it all boils down to. If you want to do it constituent by constituent, that's fine. Because water has constituents in it. Okay. If we were going to assess each particular constituent, you would go crazy with the risk assessment.

We want to show -- what the whole basis of this 97-005 Policy is that when you treat this water you're basically going to take it down to nondetect levels. Okay. We -- and the operable units do not allow treatment down to the MCLs. You have to treat down to the lowest level you can get, or nondetect.

ROBLES: That's the ultimate goal of this policy.

VECCHIO: That's the ultimate goal, yes

ATWATER: That's the variable technology (INAUDIBLE)

VECCHIO: Right

ATWATER: Those are the common Epa Safe Drinking Water Act.

VECCHIO: Right.

ATWATER: That's the good news with the Calgon unit. Basically you're getting a nondetect so

basically it wouldn't be an issue.

(MULTIPLE SPEAKERS.)

PALMER: With perchlorate at least.

ROBLES: With perchlorate at least. That's the problem. The cost effectiveness could be (INAUDIBLE) pump it back in there, because to get a permit to go to nondetect is more costly. It comes down to not only just regulatory but cost, risk assessments. All these issues have to be reviewed.

ATWATER: I think with the Pasadena air stripper you're getting consistently nondetect.

RIPPERDA: But air strippers are a lot easier than --

BURIL: Ion exchange.

ATWATER: Well, yea. But I don't understand, Peter. I thought the test results were you're consistently getting nondetect. So there is no cost curve. Either you treat with the ion exchange and --

ROBLES: The key is the quantity.

ATWATER: If you wanted to, hypothetically, treat it to the State action level of 18, I don't think you could operate the ion exchange that carefully and save you any money by doing it.

ROBLES: No

BURIL: Vera, was there any requirement -- if my memory serves correctly, there is a requirement regarding source characterization for contaminants built into this. Is there something like that?

VECCHIO: Source characterization?

BURIL: In other words, you understand where your contaminants are coming from (UNINTELLIGIBLE)

VECCHIO: Right. Yes.

BURIL: Could you describe that a little bit too, please?

VECCHIO: Well, I think ultimately -- okay. This is a single point source, whereas most of the other ones are multiple-point sources. So what we're looking at in this particular case is, for example, let's say you have a chemical show up in a monitoring well. Okay? Is that concentration going to go up, because that was a recent -- that was something more recent that occurred and so as a result over time the concentration is going to increase and is it ultimately going to get down to the extraction wells?

So basically what we have to look at is when this occurred, when the actual contamination occurred, is it a continuing process or has it ceased and when did it cease.

So it basically refers to multiple sources as opposed to a single source.

For example, let's say you were using perchlorate on site right now. Okay. You were still disposing of it illegally, let's say.

BURIL: But we aren't, folks, for the record.

VECCHIO: Just say that you were. Okay. We would have to look at that and say, okay, there is another process that has to occur here. That has to cease. That's what the source characterization boils down to.

CAJINA: There's something else, though, and this is particularly important, I think, for anybody who is investing or paying for the treatment and for the water systems to think about, is that, okay, we have a handful of things that we've already identified and we know that they're here. What about other things that might come up, perhaps we haven't ever tested for them or had any reason to have stumbled across them yet.

But what we're trying to avoid is that we put in treatment that will treat for this and this and this and then next year something else comes up, as we've seen with perchlorate, and all of a sudden your back to square one again.

ROBLES: How do you avoid that?

CAJINA: What you do, and this depends a lot on what JPL, what kind of information JPL has to provide, is you look at what the operations here have been. What kinds of constituents have been used, transported and/or stored on site and which of those present a reasonable risk of having gotten into the groundwater.

At that point you can actually do some monitoring for some of those things and some of those might be things that we haven't specifically looked for in the past. In doing so, I know you guys are kind of on alert about this because it's -- you know, you're not crazy about the idea of finding anything else that's new.

But you have to think about the fact if you're going to distribute this water and you start distributing it and all of a sudden something else comes up for whatever reason, okay, that first of all invalidates the permit that you have to treat right now.

Second of all, the public at this point is going to come up and say, "Well, wait a second, Water System. You told me that we were getting potable water and now you found something else that

we've been getting all along and you're telling me all of a sudden it's not good enough to drink anymore."

And that's when we get into lawsuits and real bad public perception.

ROBLES: But I still say how can you avoid that? For example, take the perchlorate case. Until there is a technology to be able to test for it, no one knows about it. And until that happens 20 years from now we can go to the parts per many quadrillion and then we can find anything in it. This used to be a black wordld site under the Army days. We don't know everything that's happened in those days. We can't assume.

The other thing is the provincial levels that the State puts on it. That has a tremendous impact on whether we have a problem or not. I can't anticipate those. So all I can do is just go forth, because if I wait until I know everything about this I will never put any type of remediation in place.

ATWATER: Well, in fact, the history (UNINTELLIGIBLE) in this is JPL and Pasadena have an agreement. They put in an air stripper. Then we found perchlorate two years ago and now you're dealing with it.

ROBLES: Right. And NASA's position, we deal with it as we come up with it. We have searched. You know, we have looked. The key is, as information comes in from the industry and from the academia, we'll go out there and test and deal with it as such. The key is I can't anticipate the State provincial level that's going to be set for these chemicals.

CAJINA: Now that you can come up with --

ROBLES: I can't. No, I can't design to nondetect. Because you see, to me, and I will be honest with you, five years ago I put a room full of toxicologists together. I closed the door and I said "Now, tell me tell me what the heck is going on." And what I found out was that alchemy is an exact science compared to toxicology.

The bottom line is how do you determine a risk level for parts per quadrillion, parts per billion. It is insane. That's why I have to work on reality. I may not be able to at this time clean to a parts per mega quadrillion to nondetect, but I can make it to a billion. So I'll do what I can with the technology and deal with it as we go forth.

The key is, to try to identify all of these sources is going to be difficult. We're going

to do the best we can. And if something comes up in the future, we got to deal with it. Otherwise, I can't put any type of remediation here until I know every rock is turned over. I won't be able to do that.

VECCHIO: We can actually give you, for example, the list of chemicals, like, for example, the Glendale OU has just gone through its complete source water characterization. There is probably still some unknown peaks that still need to be identified.

But, you know, they've come up with 72 chemicals that have shown up, you know. 24 are appearing in the extraction wells. We don't know if all of them are treatable, you know, under their treatment technology. And there are some that are going to probably be coming down the road, maybe ten years from now or five years from now.

ROBLES: Right.

VECCHIO: So what we're having them look at is the treatability. With the existing proposed treatment system are these chemicals going to be treatable?

There's another problem that occurs. When you get this mixture of chemicals there's actually

breakdown products.

ROBLES: Yes.

VECCHIO: Some of them break down into something else or something mixes with something else. It may not have been used, but you'll end up with a chemical in the water that was never used but now is showing up, and it's usually a breakdown.

ROBLES: Right.

VECCHIO: And the new chemical of the month is 1, 2, 3 TCP, tricloropropane. Right.

CAJINA: That's about right.

BOMAN: You better say that again.

VECCHIO: 1, 2, 3 TCP, tricloropropane. Very high levels in the Burbank Operable Unit.

It's not showing up. And one of the reasons why, it's all in the analysis. When you've got really high levels of things like TCE and PCE, you have to dilute before you analyze. When you dilute, you bring your detection levels much higher. So all of these other little constituents that may be showing up at the influent to the plant are not coming out in the analysis. But now what we're finding out is if you take one and run it one way and you take another and you dilute it, you're actually seeing all these constituents. And these

are all constituents that are in the RI wells, the remedial investigation wells.

ROBLES: That's good to know.

VECCHIO: They're coming on down. So basically what we're going -- with every Operable Unit from now on we're covering our butts. We're covering our butts for us and we're covering the butts of the water systems so that you characterize this water up front. Okay. You know what's in there. There may be some X chemical that you don't know about, but at least you do your best effort to characterize.

ROBLES: Okay.

CAJINA: And if there is something that perhaps we don't have an action level for --

VECCHIO: We can get it.

CAJINA: -- of any kind, but there are known health effects. Perchlorate, for instance, or MDMA, we knew immediately that those things have health effects because studies have been done back to whenever. It's a lot better if we know about it now rather than later even if there's not an approved treatment and technology, even if there's not an action level or MCL it's to everybody's advantage, at least we can anticipate it a little bit. If we find something that's not there now but might get

there within ten years, that gives us a five- to ten-year start on thinking about what treatment is going to be and getting it approved rather than shutting everything down and once it suddenly pops up.

ATWATER: Where are (INAUDIBLE) you in Burbank and Glendale? Have you held your public hearing and completed their report? Because I thought Glendale was going to try and start up in October.

VECCHIO: Yeah. Good luck.

They're in the process right now of completing their 97-005.

ATWATER: So they're doing their report.

VECCHIO: Yeah. We're looking at holding a public hearing probably maybe sometime September -- September.

ATWATER: Should JPL look at that report as a prototype to follow as a road map? Do you recommend that?

VECCHIO: Yeah. There's others.

ATWATER: That's a more complicated situation because you've got multiple plumes and you got multiple sources.

VECCHIO: There's others.

ATWATER: This is a lot simpler. Right?

VECCHIO: There's the Santa Monica, the Sharnock and the Arcadia.

ATWATER: (UNINTELLIGIBLE) MDMA (UNINTELLIGIBLE)

VECCHIO: MTB.

ATWATER: Excuse me.

VECCHIO: They're going through that process. They've gone through that process.

MAGANA: How about San Gabriel? Where are you?

VECCHIO: San Gabriel, that's a whole other ball game that needs to start up, which isn't happening, which is partly happening but not happening.

ATWATER: Are they going to do that for La Puente?

BURIL: One of the questions I'd like to ask is can you share with us any information that's available regarding La Puente or the suburban water company efforts?

VECCHIO: I can only share it if these people choose to.

BURIL: Okay. That's fine.

VECCHIO: If, for example, I called CDM and said, you know, would the RPs be willing to share this chemical list, listing, okay, I would have to get permission to provide that information

BURIL: Sure. Can you discuss at all the progress, in general terms, that they've made in dealing with this policy?

VECCHIO: Yeah. They've done it section by section. They did a complete outline for us. They gave us a time schedule.

CAJINA: This is Glendale.

VECCHIO: Glendale, right.

ATWATER: CD is the contractor for Glendale.

VECCHIO: They're actually the contractor for the respondent group, which are the RPs.

BURIL: Vera, do you know the kinds of processes which generated this 1, 2, 3 TCP concern?

VECCHIO: No

BURIL: It's just there.

VECCHIO: Just there.

PALMER: Vera, let me try to get squared away here. The list of the suite of --

VECCHIO: The suite of chemicals?

PALMER: -- of chemicals to test for sounds like it would be a combination of a list that you can furnish to them, and a list of -- I presume there is a listing of what's -- I know not everything, but you have a listing of every chemical, I presume, that you know of that's been used on site.

VECCHIO: That's what that was --

PALMER: That would be this combination of --

VECCHIO: Combination, right.

PALMER: Whether they're regulated or unregulated, you have those.

VECCHIO: Right.

PALMER: Number two, you stated that down the road if a new bad guy shows up here in a contaminant, that invalidates the permit. Is that what I understood you to say?

CAJINA: If something comes up that is of health concern, that's present above what might be considered a level that threatens human health and it cannot be treated by the present technology, naturally at that point we'd have to --

PALMER: That's not a separate permit process -- that's the same thing that would happen today --

VECCHIO: Right.

PALMER: -- if it was a public water supply and perchlorate showed up.

VECCHIO: Right.

PALMER: Okay. So that's not a special --

VECCHIO: It's nothing special.

PALMER: Okay.

CAJINA: It's common sense type stuff.

PALMER: Got it. Okay

BURIL: Let me ask another question with regard to source characterization. This may go to one of the comments that the Raymond Basin has with regard to our RI, but I'd like to just hold that discussion for a moment and take this as a given.

We appear to have {percholorethene coming down to us from somewhere upgradient. And the idea of a source characterization for something which is upgradient from JPL is a concern for us. What would be the requirements of that source characterization portion of 97-005, with that in mind?

VECCHIO: I believe the same. Unfortunately, we can require that the water system do that. Okay. But it is really not the water system that has caused the problem. So we have to go to other agencies. We have to go to the Regional Board. We have to go to the Department of Toxics for them to do an investigation in that area. Okay. And once there are potential parties that are identified, then the potential parties go through that process

BURIL: I see. But as far as any kind of a treatment system, say, for example, we wanted to implement some form of a treatment system here at JPL, and you'll see some of those when we get down

to the next item. And it was desirable on both parties' parts, Raymond Basin and ourselves, to supply the water to some water purveyor who would utilize the water for their customers. That upgradient characterization would need to be complete prior to a permit being issued to be allowed to do that?

VECCHIO: Oh, yeah. Yeah.

CAJINA: if it's there, it has to be treated one way or another, no matter who --

BURIL: If the treatment system that we had in place was capable of dealing with the contaminants as we understand them today but with the source characterization was incomplete in terms of knowing where the responsible parties were and so forth --

VECCHIO: We can good back and ask them.

BURIL: -- would we be able to proceed at that point in treating water and providing it, or would we not

VECCHIO: Yeah. Because I believe the Regional Board was here at the last meeting and they stated very specifically they were actually investigating that area.

CARLOS: I think that was DTSC.

BURIL: I think that was DTSC.

VECCHIO: DTSC?

GEBERT: Right. It's on the workplan for the next fiscal year.

RIPPERDA: Since the levels that are reaching from there down to where JPL is there's the -- downgradient water purveyors are relatively low, JPL could probably just show the plumes as they know it without having to do a complete vadose zone characterization underneath them, half a dozen dry cleaners and all that. They can just show this is what's in the water, our treatment system can easily handle it.

VECCHIO: Right.

ATWATER: We're talking about PCE Z right around MCL.

VECCHIO: Right.

CAJINA: It sounds like it's a situation where we'll have a pretty good idea what the contaminants are. If it's dry cleaners and regular industry, we've kind of seen that and you guys can probably document it pretty well without going into too great of an investigation. It gets a lot more complicated on sites like this where it's a lot less -- we've never dealt with some of this stuff.

PALMER: And I think the other key, and by the

way, we aren't conceding that's the case, but if, indeed, it's from La Canada area, it's not only dry cleaners, but degreasers that were used in cesspools, so your responsible parties number several thousand homeowners.

VECCHIO: Homeowners. Right.

PALMER: So it get very complicated.

RIPPERDA: As long as JPL is putting in an air stripper anyway and they're not going to try to go after hundreds of hours of peas for reimbursement, just so long as their treatment system handles its nondetect --

VECCHIO: Right.

RIPPERDA: (UNINTELLIGIBLE)

Robles: Our bottom goal is whatever treatment we put in for the impacted City of Pasadena and Lincoln Avenue, if it happens to clean PCE, so be it. You know, we're not immune to -- we're not going to say we're going to clean this and not clean this. That's not how our technology works.

VECCHIO: Right.

ATWATER: The only chemical that really is in issue is nitrates, since you know the source of nitrates.

VECCHIO: And we allow for blending. We allow

for blending at a -- because, for example, the Burbank operable unit and the Glendale operable unit --

ATWATER: Both have nitrate problems.

VECCHIO: -- they both have nitrate problems. And one of the last treatment processes after it's gone through the air stripping GAC, then the water is chloraminated and then the water is blended prior to distribution. So we consider blending as a treatment. It is an acceptable treatment process. EPA does not.

RIPPERDA: Well, we can certainly work on some of that. I thought from reading your policy that with a contaminated source you do not allow blending. So actually I'm happy to hear that. So they do have perchlorate and they can treat like two wells and take two other cleaner wells and blend the results.

VECCHIO: Right. And blend the results down. Right.

For example, when you have pea soup, when you have alphabet soup, when you have a number of different volatile organics present, we have a provision in the permit that says that you operate this treatment facility so that it is optimized and

that you always remain below a hazard index of 1. And a hazard index is what you take the concentration in the effluent of each one of the constituents, divide it by the MCL, add these all up and so that each one of these stays below a 1. Okay. If you start going over 1, then you need to change, for example, like the air-to-water ratio so that you actually increase the removal of certain constituents.

So we give an operating parameter that tells you when you have a number of constituents you try to -- you always try to get those to the ND. Okay. Because you're operating parameter is the hazard index of less than 1.

Things like perchlorate, for example, you don't have to treat it down to ND. It's not required. Just like, you know, with nitrates. It's not required. You can blend those constituents. It's the volatile organics that we have real trouble with when you've got a multitude of them.

ROBLES: Because the index will go over 1.

VECCHIO: Right. Because the index would go over 1.

So we're not requiring that perchlorates go down to, you know, down to ND. We're not

requiring nitrates to be treated down to ND. We're saying ultimately when you've got X treatment for perchlorate, Y treatment for the VOCs, you are now going to have another treatment which is called blending and you reach the provisional action level of 18 and you meet your nitrate MCL of 45. We always give 36 as being the goal to achieve for blending.

CAJINA: For nitrate.

VECCHIO: For nitrates, yeah. We say blend to a goal of 36 and that gives you some cushion, because nitrates can go up very rapidly. So blend to that goal of 36. And we've put that in a permit for Burbank.

RIPPERDA: So even though under the 97-005 you would want a risk assessment comparing the treated water as a result of whatever action they take with current publicly distributed water.

VECCHIO: Right.

RIPPERDA: It doesn't have to be less than that as long as it meets, for perchlorate, the standard of 18 plus some cushion.

VECCHIO: Right. Right.

For example, let's say it were distributed to the City of Pasadena. They have other wells that

go into Windsor Reservoir. At Windsor reservoir it gets blended. And then is it the Atlanta booster? The Atlanta booster they take a blend sample. That blend sample, the nitrates have really been taken down, along with the perchlorate levels.

So you would do -- you would do an analysis of really what was going to go out into the distribution compared to what's already there, for example.

PALMER: Vera, then if I understood what this process is that they are in the process of looking at or deciding on remediation method --

VECCHIO: Right.

PALMER: But you have a vehicle, if nothing else, a billing vehicle available to help them if they need input at that point until it's decided that it's going to go to a utility or not go.

VECCHIO: Well, we could decide, for example, if Raymond Basin wanted to become the vehicle. Like we could charge the Raymond Basin and then you can collect from whoever utilities are involved with this. Or you collect it from JPL. But we could use you as the agency through the remediation process in the review.

For example, let's say the ultimate goal

was not for it to go to City of Pasadena. You can still retrieve the costs back from JPL if we charge you.

PALMER: But in the preliminary stages for them to make up their mind, you have a vehicle -- I mean before they decide they're probably going to want some help. Hey, here's what things are looking like and so forth.

VECCHIO: Right.

PALMER: That could be handled. But once the decision -- let's say the decision is made that we need mediation, the process is going to involve going to the public water supply. You then make a -- that goes to the utility, let's say it's Pasadena, or do you -- it was interesting. They have the option of becoming a water utility for permitting purposes.

So don't go there? All right.

ROBLES: We're totally not in the business.

PALMER: But then the characterization plan is prepared and approved by you. Is that correct?

VECCHIO: Yeah. Let me tell you something. This whole process is a lot of work. Okay. It's a lot of work. And we can't spend the time on it unless we have an agency that we can bill.

If, for example, we can set up a special deal with Foothill where we say, okay, we have a special funding code, it's 081 Toxics. We can -- anything that we do with JPL can go to you in your bill, you retrieve the money back from NASA. You just present them with a bill and show it to them. That's how it's been done with all the other water systems.

PALMER: You forgot one step. And they pay it.

VECCHIO: And they pay it.

PALMER: You didn't say that. Okay.

VECCHIO: Yeah, and they pay it. (UNINTELLIGIBLE) direct.

ATWATER: Can't you do the direct 1 percent with like you can' do with --

VECCHIO: No, we can't.

ATWATER: You can't use that cooperative agreement?

VECCHIO: No. No, we can't. It just doesn't work. We can't do it that way. But for example, let's say down the road -- let's say down the road City of Pasadena does become the recipient. We can at that point change the billing to City of Pasadena.

PALMER: (UNINTELLIGIBLE) Permit. I see.

VECCHIO: Right. But we do need to have the funding mechanism up front. Okay. Because we can't be involved with this process otherwise.

ATWATER: Vera, you're right, because at West Basin, this billing system --

VECCHIO: Right.

ATWATER: -- she had to bill through El Segundo and Manhattan Beach and then the districts reimbursed the public systems for getting the permits on cross-connection control and all your permitting. So it works.

VECCHIO: It works

BURIL: Vera, is it possible in trying to establish a mechanism here that there could be an interagency agreement between your agency and, let's say, DTSC or Regional Board, that their costs and your costs would be billed to us through their mechanism?

VECCHIO: No.

ROBLES: The only agreement that we can have is with another RPM. NASA requirements. We make an interagency agreement between EPA and the State of California. And individually with DTSC. We need to enter into agreement with DHS and then you voucher us, we'll pay it. That's not the problem. We have

to enter into an agreement. I can't be billed from Raymond Basin because I don't receive anything in kind.

(Mr. Hightower entered the meeting room.

ROBLES: And they are not a regulatory agency. That's where the problem lies. Billable hours, you know, you just charge us. We'll pay by the hour. I mean, that's how it always works.

VECCHIO: That's the way it would work.

CAJINA: Our problem is the way that we're legislated.

VECCHIO: Right. We can only do that, we can only charge water systems.

ROBLES: But you can't work an agreement with DTSC?

VECCHIO: No. Doesn't work

BURIL: Let me just take a quick second. If you could introduce yourself, Rufus.

HIGHTOWER: Rufus Hightower, general manager of Pasadena Water and Power Department. Sorry I'm late

BURIL: I'm sure the security folks didn't make it easy.

PALMER: Assuming that gets solved, then, that characterization plan has to get your seal of approval, DHS' seal of approval.

VECCHIO: Right.

PALMER: And all of this is prior to the public hearing. Right?

VECCHIO: Oh, yes. Absolutely. Because for example, let's say you do your raw water characterization, you come up with a lot of chemicals and you go, I don't think we can do this. You're still going to have to treat. Okay. You're still having to going to treat because then you you're going to discharge back into the ground. Okay? The Regional Board's requirements are going to be pretty strict also for your treatment. So your ultimate goal is probably to use it for beneficial uses, and that is to deliver it to a customer.

CARLOS: If they treat the water and reinject, will this policy apply?

VECCHIO: No.

CARLOS: Only if it's for domestic.

VECCHIO: Only if it's used for domestic purposes. We will pass the information on to the Regional Board because we review their permit document. We just did it with the Whittier Narrows operable unit. They're looking -- they're working in phases out there and that is they're taking the

shallow stuff first. They're extracting, treating and injecting. They still got to deal with wells that have been contaminated that are further down in the aquifer that water systems are using. So they've got to look at treatment for that.

So they're doing that in phases. They're taking the shallow, and then the deep. Then, of course, there's also the Baldwin Park operable unit, which is probably going to be four phases, for different sites

BURIL: Basically what I heard you say before, then, if we were to establish some form of remedial action and wanted to provide it to one of the water purveyors, that we could have something perhaps similar in terms of phasing in dealing with upgradient contamination.

VECCHIO: Right

BURIL: We could begin treating and providing water as long as we knew that the water was being treated appropriately at the point of withdrawal and prior to distribution --

VECCHIO: Right

BURIL: -- without characterizing all of the sources prior to doing that. Is that right?

VECCHIO: No. No. No. You got to characterize

it all before you treat and deliver.

BURIL: So everything upgradient would need to be characterized prior to any implementation of treatment.

CAJINA: I see what you're getting at. I think the thing to remember here is the bottom line is for us, we need to have as good a picture of what's going on as we can possibly get, given --

MAGANA: Worst case.

CAJINA: -- the information that's available and that can be gotten. So that would present us with a big kind of unknown area, big gray area. And we might not know what's going on there. So whether you guys did it or the water systems took it on or somehow certain responsible parties were identified to get on board with you isn't so much of an issue. But it has to be done by somebody. In most cases this would fall to the water system that is trying to distribute water. In this case there may be multiple systems involved. You guys got to work out amongst yourselves how it gets done.

BOMAN: I got a question. If we were to just take the water out, treat it and then spread it or inject that water back into the basin, what type of regulations would we have to deal with?

VECCHIO: That's the Regional Board and they're going to be just as strict in terms of the type of treatment required for injection. Because what they're going to tell you is that you have to cease contaminating the aquifer. So you're going to have to treat to drinking water levels anyhow, okay, and then inject.

ATWATER: Wouldn't you be involved just like a reclaimed watery charge project?

VECCHIO: We would basically at that point --

ATWATER: Advise the Regional Board.

VECCHIO: We would only deal with the Regional Board in reviewing their permit document

BURIL: Let me just emphasize one point, though, just to be sure I'm clear, that prior to any treatment beginning on any water purveyor's system or with a system that would provide water to a water purveyor, regardless of the site, if there are unknown sources upgradient that have potential influence to a site, those upgradient sources must be characterized prior to the beginning of any treatment and supply of water.

VECCHIO: Right. Absolutely.

HAYWARD: I have a question. It seems like the conversation keeps leading this water or seeing this

water to a water purveyor to make beneficial use of it. But then Stefan mentioned that there's a degree of liability involved here.

VECCHIO: There's a degree of liability. Absolutely.

HAYWARD: So there would have be to be some clear language as far as indemnification is concerned. For example, Lincoln would be interested in taking this water. I can run it through Foothill and let Ron Palmer --

PALMER: Blame me.

BURIL: Before we enter into that particular realm I'd like to try and be sure -- I realize this is more of a technical and requirements discussion. I'd really like to avoid discussions regarding liability and so forth because that's not something that we're prepared to discuss in this meeting.

ATWATER: Switching back to the permit issue, Shan and I were just talking. Shan's got a way to solve your reimbursement of DHS.

KWAN: The present VOC agreement, before we got that contract with you guys, we accumulated some costs and whatever and then during the agreement we put that into the agreement for you to reimburse us. And we've already started doing that for perchlorate

also, you know, the time that we put in to study.

ATWATER: You probably had --

BURIL: As a matter of fact, what I'd like to do is --

ATWATER: You probably (UNINTELLIGIBLE) at DHS had to permit that facility, too.

ROBLES: So if they bill you and you --

ATWATER: Under your existing agreement --

(MULTIPLE VOICES.)

VECCHIO: That's fine.

ROBLES: That's a good way.

BOMAN: You don't break out.

VECCHIO: We break out. We have a straight charge for that. It's called -- it's 081.

ROBLES: Thank you. That's good way. That's a really good way.

ATWATER: In fact, indirectly you probably already did that when you permitted the first facility

BURIL: Let me recap what I just thought I heard because I had a side conversation briefly.

That the City of Pasadena VOC plant agreement is a mechanism by which, when we renew it, coming up here, that we would modify it to allow them to bill you and you in turn to bill us?

ATWATER: Existing agreement allows you to do that.

KWAN: Not exactly. We started accumulating costs separately for what we're doing on perchlorate already, separate from the VOCs. So I think we can model it after the VOC, whether we modify it or we have a new agreement for the perchlorate. Then we'll just accumulate all those past costs that we had and dump that into the new contract or the amended contract for VOC.

BURIL: We'll have to take a look at that when we get to that point.

ROBLES: We'll have to talk to Sammy because the key is -- but that's a viable way to figure it out.

VECCHIO: I tell you, we keep -- we have to keep an accurate diary of everything that gets done. Okay. And then we bill. We can actually produce an Excel spreadsheet basically saying we've had a phone conversation, such and such a day with such and such and such.

BURIL: That's fine.

VECCHIO: Okay. We spent X number of hours reviewing your report.

ROBLES: That's what we get from -- that's what we get already.

BURIL: We get similar, although not as detailed information from the Regional Board and DTSC.

ROBLES: We just have to get the lawyers to agree.

VECCHIO: Okay.

BOMAN: Vera, you can bill everything to Lincoln that you're spending.

VECCHIO: That's Pasadena. We can bill part of it to Pasadena and part of it to Lincoln.

ROBLES: Funny.

BURIL: Equal opportunity sharing.

VECCHIO: Okay. Ultimately I guess I'm still hearing -- I'm still hearing that it is a possibility that you're thinking of treating and injecting. That's a very --

BURIL: That is a very strong possibility.

PALMER: Then that brings Raymond Basin back into the picture of terms of a -- I won't call it a regulator, but effectively a regulator because the court says this is what we shall and shall --

BURIL: That's really the basis of this meeting is to, you know, one, get some understanding of how the DHS policy does impact anything that we might try to do here at JPL and how that might impact you folks as well. And we may be at a point of segueing

to the list of alternatives if there are no further questions that anybody has of Vera regarding the policy.

CUTLER: I have one clarification. At the very beginning when you have giving an overview of the policy you said the basic philosophy of this policy is to treat to nondetect and then later you said you don't really have to treat to nondetect. Just to clarify, we don't have to --

VECCHIO: No. I didn't say that. What I said was is that the philosophy behind all of this is that the Department would prefer water systems to use the best quality sources as opposed to the worst quality sources and then to actually drill extraction wells to get the worst quality water. Okay.

And what defines the criteria is on the second page of this policy. There are six different conditions under which it would define a water as being extremely impaired.

It's the VOCs we want to treat down to nondetect because that's where you have multiple constituents and that's where we deal with the hazard index. Okay. There are other constituents such as perchlorate, nitrate, could be chromium for

all we know. It could be any other chemical. Those do not have to be treated down to nondetect, but they have to be treated to meet the MCLs.

CUTLER: Thanks.

KWAN: Vera, if JPL decides to treat and reinject and for whatever reason, the well that we put out of service, it's -- the water that comes out of there now meets all the MCLs, for whatever reason, blending underground and whatever, we would still have to go through that process to bring that well back in service. Right?

VECCHIO: Right.

KWAN: And because we're doing the City it now the city would have to go through that process.

VECCHIO: Absolutely. I know what going you're to turn around, and that is you're going to go back to JPL. Because this may mitigate plume movement, okay, further plume movement, but it doesn't mitigate your problem.

BURIL: I've gone ahead and passed out the table that I have. I apologize if everyone doesn't have a copy because we did have some unexpected guests show up.

ROBLES: I think everybody does

BURIL: I'm hopeful if you don't have one of

your own you can share with the person next to you.

These are things that our current feasibility study is looking at. And these kind of go by the numbers, if you will, the kinds of things that are expected to be reviewed in a feasibility study. We didn't try to cut anything out up front. We wanted to be sure you folks recognize the kinds of things that we're looking at overall.

In just walking through these briefly, then, I'd encourage you as we go through to just ask questions if you have any, and we'll try to explain a little bit more about them.

The "No Further Action," I think that's somewhat self-explanatory. Basically, we're going to continue the current activities, which include VOC removal plant for Pasadena and also for Lincoln Avenue. And continue blending, as necessary, to deal with the perchlorate issue.

Limited Action. Remediation by natural attenuation. What scenarios we might generate to deal with that we would evaluate by EPA protocol. We aren't currently looking at that right now.

Under flow management, we focus here on perchlorate. As it stands now we have a concern that Well 52 is going to continue to rise as far as

the perchlorate concentration. And one of the things that we thought might be of some benefit would be to reduce the amount of time or the flow rate from that well to slow the spread of the perchlorate into that well. How practical that is, we don't know. We would view this as really an interim action in order to stem the more rapid spread of perchlorate into that particular well. And then maybe ultimately into wells further south.

First of all, does everybody understand and remember where the wells are and so forth? I talk about Well 52 and so on. We have a map here, I think, that will help clear that up.

It's the next one underneath, Pete.

I've become so familiar with these myself but not upside down.

ROBLES: That's 52?

BURIL: That's 52. Then Ventura, then Windsor. And the other two white circle red dots are Lincoln Avenue 3 on the left and 5 further out.

(Multiple voices.)

BURIL: So that just gives you the lay of the land there.

The other green dots that you see are some of the JPL monitoring wells. We don't have them all

up there on that particular map. If you want a detail on the individual wells for JPL, we could show you the other one. The blue tagged wells that Peter is putting up right now are off-site monitoring wells. And we have five of those. Okay.

Moving through this, then, still under the general response of limited action, groundwater monitoring, we plan to continue that. We already have a program in place, as I know the Raymond Basin is aware of. You get that wonderful barbell of a report every three, four months. We plan to continue that as part of the requirement of remedial action not only to monitor the status but to understand just how well the remedial action is continuing to work or not work, depending upon the nature of it.

Under Institutional Controls, this would be something to the effect that we would have some type of a regulatory restriction on what was ultimately going to be used, defining treatment and disposal parameters.

Under that same kind of institutional control an obvious one, one which I think Vera alluded to earlier in using the best available water source, would be to utilize an alternative source of

water. In this case the City of Pasadena and Lincoln Avenue wells would be shut down and alternative water supplied as they became unusable for whatever reason.

In terms of containment, we looked at things like capping. Somehow the idea of capping the Arroyo Seco didn't make a lot of sense to us, so we have not developed scenarios with that at this time, although if one presented itself that made sense we certainly would look at it.

Vertical barriers suffer a similar fate because our aquifer is so thick and deep, in excess of several hundred feet to over 1,000 feet in places. So this type of approach is something we have not pursued at this point.

Under Hydraulic Controls, this is where we deal with extraction and reinjection. And really, that is a containment method that's also brought out under collection.

And here is where we get into some of our musings on what we might actually try to do. Now, you'll notice that we've got 1a), -b) and -c), 2a), -b) and 3, 4a) and -b) and 5. Usually the way these things are set up are 1a) -b0 and -c) are what I'll term variations on a theme. I think as you read

these you'll recognize that these you'll recognize that these are just slight differences between them. For example, 1a), continue the current remedial activities plus the intent to provide wellhead treatment for perchlorate at the Arroyo Well currently.

And then 1b), that we would deal with both the Arroyo Well and Well 52.

And 1c) is that we would provide wellhead treatment to all of the wells as necessary to maintain the appropriate water quality.

So you can see that we're talking about continuing the same thing and doing perchlorate treatment at one, two or more wells, depending upon the need for reducing the perchlorate.

On the second series, we would continue remedial actions very much as in the scenarios 1a), -b) and -c), except that we would add an on-site extraction well to deal with the source reduction issue. So each of these is basically identical to 1a), -b) and -c) in terms of the off-site approach, but with the addition of an on-site extraction well system.

BOMAN: Any idea what flow?

BURIL: The on-site extraction system, we're guessing around 500 gallons a minute would be sufficient to stretch across the site. We're modeling that right now in a number of different scenarios to try and understand that we have reached a reasonable area.

When we talk about reasonable area, we're talking about dealing with stuff that would be the most highly concentrated right here on the site, based on our remedial investigation. We wouldn't try to extend the radius of influence to reach, say, from where we're sitting now all the way to the Arroyo Well. That's why we would want to continue to utilize the possibility the Arroyo Well or some other wells to deal with material that is outside of the influence that would come from an on-site well.

BOMAN: But it would stop the --

Buril: It would stop the more concentrated materials from continuing to migrate.

BOMAN: Continuing on into the basin

BURIL: Right.

VECCHIO: I think, actually, that they're finding the in situ actually is more effective and you actually remove more of the chemical much more quickly than you do from actual treatment of the

water and they're finding this out at sites out in the San Fernando Basin, that percentagewise, the extraction of the soil is probably 75 percent better than actually treating the water. So you might want to talk to some of the --

BURIL: Is this in terms of soil vapor extraction?

VECCHIO: Soil vapor extraction. Also, because I don't know where it is -- I don't know if you still have it in the soil here on site or whether it's actually all reached the groundwater to date.

BURIL: Let me make a comment on that. This Table is specific to {END SIDE 1) groundwater only. In fact, we do have an Operable Unit that deals with sources in the soil. In fact, we have a current pilot program in dealing with soil vapor extraction. It's running as we speak.

VECCHIO: Okay

BURIL: From what I understand, it's wildly successful.

HOSANGADI: Yes.

VECCHIO: Right. That seems to -- (START SIDE 2) that seems to be the check. That's the one that seems to take it out the fastest and that is what stops the contamination from continuing

BURIL: Yes. And we recognize that. In fact, we are hopefully going to be finishing our pilot up in the next few weeks and depending upon the outcome, we may be suggesting some form of interim remedial action utilizing SVE.

VECCHIO: Right. Okay

BURIL: Okay. Moving back to the list here, under number 3, what we're basically thinking here is that things that are currently going on at the various plants continue, but any additional work that we would do would be done separately from any interaction with water purveyors. We would install our own wells, our own treatment processes and so forth and just treat the water and then dispose of it in one mechanism or another.

Under number 4, the 4a) and 4b) are somewhat unique in the way that we try to deal with things. This assumes that for whatever reason, technical feasibility or anything else, perchlorate can't be treated. And because of that, we've looked at this as a mechanism to try to contain the perchlorate plume rather than remediate it. And by "containment" I mean that we would utilize either the Arroyo Well or the Arroyo Well and Well 52 as a mechanism to prevent further downgradient migration.

And that when that water was treated for VOCs, we would then go back upgradient and reinject and try to establish as best we can what I would term a closed loop so that we now just have this stuff sitting there, not moving and not endangering anything else.

The practicality of that is something that we're still trying to model. But that would be if we just don't find a mechanism that effectively deals with the perchlorate issue.

Last is doing the same thing in terms of containment, but that we would not use any of the water purveyor wells in doing so. We would use our own wells and the water purveyors would continue with their activities for as long as they're able.

Subsurface drains, interceptor trenches, I think groundwater where we're sitting right now is some 250 feet below grade so that's a heck of a trench. I don't think that would be one that we would view, but if something did come up, we would certainly evaluate it.

In situ physical treatment, air sparging, dual phase extraction. Basically, we don't believe that is going to be an effective means of dealing with this particular site. And similarly for in

situ chemical reactive walls and injection of oxidizing reducing agents don't appear to be a viable thing at this time. We have not determined a scenario that would be of use. If one does exist, we would certainly evaluate it.

And basically we go through until we get to ex-situ physical. And ex-situ physical we're talking about the standard types of water treatment. Carbon absorption and air stripping for VOC treatment, ion exchange or reverse osmosis for perchlorate treatment. And those treatment mechanism would be utilized in one of the collection scenarios that's identified in the collection section.

Ex-situ chemical, UV oxidation and so forth, we have no scenarios to evaluate at this time.

And biological, we are evaluating biological treatment for perchlorate. And, of course, the ultimate disposal, if you will, of the water would be subject to all the regulatory issues.

When I talk about disposal we're talking about what do we do with our process waters. Reuse as a drinking water source, as we've been talking about all the way along. Disposal to water bodies.

We currently don't have any scenario that we would actually put it in to say the spreading basins or something like that, although if something like that were to present itself, we could evaluate that.

Disposal as irrigation water. Again, we've heard suggestion to that, although we have not developed a scenario that would put us in a position of trying to figure out how well that would work.

Disposal to a treatment plant, this is basically dealing with wastes that are generated from the various treatments and that we would dispose of them at an appropriate treatment plant, for example, RO process waste, the brines that are generated, if we were to use reverse osmosis.

And then last, of course, reinjection. The ultimate disposal would be to turn around and put it back in the ground.

These are the conceptual ideas that we have thus far. And I would turn to you folks and say what do you think, give us your reactions to these thus far, if you have any.

ROBLES: Or if you need to mull it over

BURIL: Or if you need to mull it over, certainly. But any immediate reactions would certainly be appreciated.

BOMAN: The one nice thing about RO is you're protecting yourself against any future, most future contaminants that would pop up. It's -- which they probably will pop up, where the ion exchange is more of a selective treatment and there could be things that ion exchange may not take out.

I'm assuming most of -- if you're treating for perchlorate you're going to have to go through two types of treatment. You'll have to go through the VOC type treatment or air stripping (UNINTELLIGIBLE).

But I just want to put a plug in for RO.

BURIL: Okay.

PALMER: I think from Raymond Basin's standpoint, we certainly want to work with you no matter what avenue you decide to go down. If you're dealing with bringing back into the water system, you'd be dealing with the water rights of Pasadena and Lincoln, let's say, of producing their water and deliver it to them. If it comes down to the reinjection, I'm going the full gamut here, certainly that's a whole new issue in terms of the court mandate. But I would -- I think I could speak for the Board saying that if that's what it comes down to as a remediation method, we'd certainly be able

to work that out. Certainly make sure -- I think our bottom line is we sure want to see something start happening real soon. That's really -- I think we'd be cooperative as to whatever approach is taken. But we would really like to start to see something cleaned up up here, get some action going. (UNINTELLIGIBLE) The Board's position.

MAGANA: I think so.

BOMAN: Vera, if JPL was to treat on site and the perchlorate levels were going to drop a little bit, could we then turn Arroyo Well back on if we got to a point where we could start blending?

VECCHIO: I don't think so, because you still got to go after this 97-005 process.

BOWMAN: The fact that we turned Arroyo Well off, and now to get it back we need to go through that.

VECCHIO: Yes.

BURIL: If they don't change their treatment process, but if we were to have the concentration in the aquifer drop to the point where when they withdraw and blend as they currently do and put that together and still meet the requirements as far as the actual number and so forth for perchlorate, they would still be subject to this?

VECCHIO: Uh-huh.

CAJINA: Yeah. Our problem with that is that now that the well has had to be removed from service because of contamination, then obviously we'd be seeing red flags all over the place, especially given what we know. So for us to say "Okay. Go ahead and turn it back on" knowing that there's a bunch of other stuff out there, and not at least making an effort to find out what that is, that puts us in a pretty suspect type situation.

VECCHIO: It also puts the City of Pasadena in a fairly viable position. I think ultimately it's the raw water characterization that's going to be the tell-all. And it's certainly being the tell-all in the other aquifer units.

You know, because we've been -- we've actually been -- our Department has been stung with a lot of these things. And so have the water systems. Because there are chemicals just showing up that we never thought -- you know, we didn't even know what they were. Okay. We've now taken a very, very, very conservative approach and this is why the 97-005. And so for any water system that has taken a well out of service because of a number of different constituents, they're going to be subject

to the 97-005 no matter what.

BURIL: Okay.

RIPPERDA: So it sounds like you guys should fairly immediately just do the raw water characterization and the source characterization.

VECCHIO: Right.

RIPPERDA: Get that turned in. No matter what remedial scheme you choose, Pasadena still has to do the 97-005 on their Arroyo Well.

BURIL: I see what you're saying.

RIPPERDA: And you pretty much -- and you have most of the information for both those.

(Telephone interruption.)

BURIL: I think that getting more information from you, Vera, with regard to the chemicals that we need to possibly look at or just get some background as to what might be entailed in this would be very helpful. How we approach this I think is still something of a question mark.

VECCHIO: I think we can take a look through like the Sharnock and the Arcadia and we can take a look at what Glendale has done in terms of the list of chemicals. And we can't provide you with the data, but, you know, we'll have to probably do some separation, but we could probably list out the

chemicals. Because when they do is they took a Prop 65 list. They took EPA's list of priority pollutants. They used the list of chemicals that were used on site. They took our Title 22, and of course our Title 22 is minuscule compared to what these other lists are.

BURIL: I have a book called The List Of Lists that's about three inches thick. So I know what you're talking about.

VECCHIO: Right.

LOSI: Can I ask a question? Last meeting I think you intimated that the permitting has to be conducted on a well-by-well basis. Is there any provision for permitting, say, two wells that are within close proximity, something of that nature?

VECCHIO: Okay. The permitting issue is, we permit a project as opposed to wells. If one well was chosen, then we would permit the treatment system for that particular well. If it came back at a later date and said, "Okay, now we're going to use a second well," we'd have to amend that particular permit. Okay?

LOSI: But would that be the exact permitting process again, or would there be a --

HOSANGADI: Amendment to the existing?

VECCHIO: It would be an amendment to the existing.

CAJINA: If the other well were subject to a unique seat of circumstances, it would have to be looked at separately. But if they were, say, in the same yard, drawing from the same aquifer or some stuff like that, you'd be most of the way there.

LOSI: That's what I'm talking about exactly.

VECCHIO: Right.

CUTLER: One thing, too, I want to point out on some of these pump and treat scenarios that may not be obvious at first pass is, you mentioned that this DHS permit may take one to three years, at our last meeting. In the meantime the water can't go to a purveyor. It might need to be reinjected to protect, say, a Well 52 or the next one down or Lincoln Avenue, whatever the scenario is. So now it seems like everybody here may be involved between reinjection and then later drinking. How would all this interact? Is this multiple permits going on at once?

VECCHIO: That's a tough question to ask.

CUTLER: Can something be packaged so one permit can handle everybody?

VECCHIO: No. It doesn't work that way,

unfortunately.

For example, let's say Lincoln Avenue became -- you know, became a user of this water also. You know, let's say -- I don't think this is going to be the scenario, but let's say that they were also going to receive that water. You would also have to do an amendment to their existing permit. So it would be City of Pasadena and Lincoln Avenue. So those would be separate permit issues.

We would permit the primary agency, which would be Pasadena, whereas Lincoln Avenue would be secondary agency. The permitting process is -- we only permit if it's going to be used for domestic water. If it's going to be used for injection, we don't permit. It's not in our jurisdiction.

CUTLER: Instead of filling out two permits at the same time, is there any way to work together? It was just a thought.

CAJINA: One to look at that is what do you think the chances are that you could show our permit to the Regional Board and they would say, "Oh, this is great. This satisfies everything we wanted to see."

VECCHIO: Right. And they got --

CAJINA: Their concerns are different. So what

you can look at, though, I mean, if those are the two main agencies you have to deal with, what I'd look at where is the overlap is before you get too far into this. So that some of the things that might cover a lot of what we want might also, maybe with a little bit of additional investigation, might also cover what the Regional Board wants. That kind of thing you want to look at now because you might be able to kill two birds with one shown. But no one paper document is going to cover you.

VECCHIO: The raw water characterization is going to be the most important issue and it's the thing that's going to have to take place right up front. Okay? Because that's going to make the determination ultimately if --

ROBLES: We're going to go get a permit or we're going to inject.

VECCHIO: Right. But there's still another issue. There's still another issue, because you may pump and treat and inject, but you still have to deal with City of Pasadena's wells. Okay. They will -- and then Pasadena will have to go through 97-005. They can use your data. Okay. You're going to have to pay for treatment for them because ultimately if they're going to use -- those are

their supplies. I think it's going to be very hard to replace with net water.

So there's a lot of issues here, and that's in the containment part of it.

BURIL: Okay.

VECCHIO: It's a dominoing effect, unfortunately.

PALMER: I want to check one more comment if I can.

BURIL: Sure

PALMER: And that is from what I'm hearing, then, the characterization, no matter what the selection is, I kind of agree with Mark, it's kind of -- it needs to get down, you got to initiate an ASAP, it sounds like, because you're going to need it no matter what and that should be on the front burner, as let's get going on it.

VECCHIO: Yeah. Like tomorrow. Because that's going to be the thing that you guys are going to run with because, okay, let's say the treatment scheme is air stripping, RO, blending. Okay. You look at the chemicals that come up. Are these treatable? That's all you care about, is are these going to be treatable with whatever treatment system you're going to put in here.

If they're not, then you got to look at what can treat that chemical. And that's even going to be for injection, unfortunately, because you're going to have to meet drinking water levels when you inject.

BURIL: Well, if that's the case, all of our containment of perchlorate plume issues or remedial actions are off the table, because if we don't have a mechanism to treat perchlorate to drinking water level, two parts per billion, then those particular remedial actions immediately come off the table.

So I guess -- I would be looking for some kind of a response from the regulatory agencies. And I think we put this in writing to you folks at one point, do we have to meet these kind of standards when treatment is potentially not available or, conversely, if existing water quality in the basin as we withdraw it, for example, TDS, if we have TDS, which is in excess of what's allowed to be reinjected or injected via the basin plan, through no fault of our own, we now have water that we can't reinject and if it doesn't have perchlorate treatment available, we can't give it to the water purveyors. We're kind of in an interesting situation there.

VECCHIO: You are.

BURIL: And so we need some guidances from the Regional Board and possibly -- Rich, I don't know if your agency would step into this as well, but certainly from the Regional Board with regard to what can we do in those kinds of scenarios. Because if we're talking about having to comply with basin plan requirements, then we're going to be treating TDS, which is really not an issue for us, as far as we can tell.

CARLOS: The letter that you folks sent the Regional Board concerning ARARs were discussing those four main questions that you raised.

BURIL: Right. Right.

CARLOS: And it's really beyond me to answer that

BURIL: Sure.

CARLOS: Some of the issues really were the Board members would have to address that. For example, if you do a reinjection, our senior management can give you some guidance as to, you know, what to consider. But eventually, you know, it would come up to the Board and the Board would decide.

BURIL: I guess we're kind of in an interesting

position, then, to ask you to please let us know how to proceed on that. Because any reinjection scenario where we end up with perchlorate or TDS or something else that isn't of our doing or not treatable, we need to have some kind of guidance because we could see a lot of these things go off the books just because they are not going to be acceptable from a a regulatory perspective.

VOICE: If you want to know now --

VECCHIO: There's also another issue. It's also what is expected from the public. Because the public might say "We don't want it just down to the action level. We want it to nondetect."

So the public has input on this on whether or not they'll take the water.

ROBLES: They can refuse --

VECCHIO: They can refuse.

ROBLES: -- to have the water taken by Lincoln Avenue or Pasadena.

VECCHIO: That's right. Absolutely.

ATWATER: That's, of course, what happened in San Jose --

BURIL: In Santa Clara.

ATWATER: -- with IBM and Fairchild. They were treated to (UNINTELLIGIBLE)

VECCHIO: They were treating them to the MCLs.

ATWATER: That's right.

VECCHIO: And it was not accepted. So that's why we're cautioning you to take it down to levels that are pretty nondetect

BURIL: I guess the distinction I'm trying to draw here is if we can't treat it as one issue, if we withdraw water that is of a given quality that, you know, treatment is available but it's not something that, one, JPL is responsible for and, two, the water purveyors would provide to their customers regardless because it meets water quality standards but doesn't meet basin quality standards for reinjection, that's the scenario I'm trying to understand what would happen.

ATWATER: But are those realistic? I mean, you're not worried about the basin plan TDS objective.

BURIL: Well, we might be.

VECCHIO: When he injects he does, yes.

CARLOS: If you reinject.

BURIL: Any scenario that I reinject I've got to deal with the basin.

ATWATER: (UNINTELLIGIBLE)

VECCHIO: Some of the requirements that the

Regional Board have are even a little stricter.

ATWATER: But the basin plan is 450. The well water at the lab isn't over 450.

BURIL: When we start doing some withdrawal here on the lab, we may be drawing in some of the upgradient water that is higher in TDS. And it's perfectly fine for distribution and so forth. That's nothing wrong with it. But when you pull it out and then want to inject it again, it falls into a new slew of regulatory requirements.

ROBLES: (UNINTELLIGIBLE) If we put wells out into the Arroyo to pump.

ATWATER: Pumping is -- extracting. But you are concerned, then, that you might exceed the 450 basin objective?

BURIL: That's the concern. Through actions, one, not of our own and, two, if it's, quote-unquote, native water quality that we're pulling out and then having to treat native water to meet the basin plan, that becomes kind of an interesting issue.

VOICE: I kind of like that idea, Chuck.

(MULTIPLE VOICES.)

ATWATER: Actually, that's not true. There's a lot of examples in Southern California where basin

plan objectives you can't pump and put water back in.

BURIL: That's fine. We need to understand that.

(MULTIPLE VOICE.)

BURIL: One at a time, please.

ATWATER: But, Chuck, from a technology standpoint right now, what we know today, you've got good performance results that both ion exchange and RO will treat to nondetect as far as the constituent of concern with perchlorate and you can clearly have the confidence and the operating experience that with air stripping you can treat the VOCs to nondetect.

So from a treatability standpoint, we have a high degree of confidence. Certainly you have a level of uncertainty that there may be a new chemical or a new something. But compared to the main San Gabriel or San Fernando, there's less concern of other contaminants based upon all of your RI work and all the other work you've gone. You've got a wealth of data and you've got it from a raw water source characterization. At least all the stuff you sent me. You've got lots of data and you're not concerned about anything else, chromium,

et cetera. You've gone through all the range, the suite of chemicals. I mean, there's certainly --

BURIL: That's something we would have to determine, quite frankly, because the list that Vera is talking about sounds to be far more extensive than the list that we have currently.

ATWATER: Well, if there is a chemical that you haven't looked at that you've known or you thought might have been used here at the Lab in the past, I assume through all the investigation --

BURIL: We've sampled for things that we thought might be a problem, based on our evaluation of historical use, but 1, 2, 3 TCP I've never heard of. And I have not looked for it.

RIPPERDA: I'm sure you actually have. It's probably in the 8270 --

CARLOS: It's 8260.

VECCHIO: 8260 suite.

RIPPERDA: Some of the things she was talking about as problems is just technical detail you don't have to worry about because you don't have such high levels that you don't have to dilute. So a lot of those little VOCs you have actually tested for and you don't have little hidden surprises waiting for you among those currently known chemicals.

CAJINA: There may be other things you can rule out right away just based on usage. If you can look at the list that Glendale or Burbank, whoever it was that produced, there may be things that are in that list that are specifically related to an activity that we know goes on there and we know does not go on here. You can rule out things that way.

CARLOS: What is 1, 2, TCP?

ROBLES: 1, 2, 3 TCP.

VECCHIO: 1, 2, 3 TCP. We have no idea. We know it was used out there.

LOSI: Can I add one thing to what Rich said about the high degree of confidence in the ion exchange and the RO? That's pretty true, but the thing that we are evaluating is disposal of the process waste from each of those treatments.

ATWATER: That's brine disposal, which is a separate issue. From a DHS standpoint that's not an issue.

LOSI: No. But I mean -- okay I just wanted to say --

ATWATER: It's a cost issue. Frankly, you can truck it to the --

LOSI: It's an implementability issue as well.

ATWATER: No. It's a cost of disposal.

LOSI: No, it isn't.

ATWATER: Why isn't it?

LOSI: In the mind of the technical people, quite a few, actually, there's just some question as to the -- these systems have been implemented with the -- or tested to the point of -- how shall I say it?

ATWATER: That's on treatability of brine. I don't disagree with you.

LOSI: Right.

ATWATER: You can do -- two other ways of getting rid of brine. Hook it up to a nonreclaimable brine line and get it to the ocean. That's simple. It's a sewer line. It's not easy to do it here, clearly.

And two, you could truck it to a site, which, in fact, is what Crescenta Valley did with their ion exchange plant to treat nitrates. Those are cost issues not -- are they implementable? Sure

BURIL: That's the kind of thing that we're looking at, obviously.

LOSI: Right

BURIL: Any other questions with regard to this list? I know it's kind of a lot to swallow in one sitting, but --

PALMER: Chuck, maybe you're going to cover it in the next item, but do we have a time frame as far as some milestone time when we're looking at decisions regarding this?

BURIL: Well, actually, we do need to start making decisions relatively quickly. Currently the feasibility study is due to the regulatory agencies the end of this November.

PALMER: I'm sorry. What's due to them? What is it?

BURIL: The feasibility study is due to them the end of November. And so some basic questions, like would Pasadena even consider allowing us to use the Arroyo Well or Well 52, or both.

Would the Raymond Basin, members of the Raymond Basin, accept water from these treatment facilities, assuming that the permitting was capable of being obtained in a reasonable time frame?

ROBLES: That's why we want you to look at this and give us your comments and say "That isn't going to work" or "That will work with some modification," or "this is way out in left field. We can't have this."

BURIL: Rufus said yes to the City of Pasadena ones.

VECCHIO: Can I go back to just the treatability again, like what levels do you bring it down to?

The Department takes a position if you can -- if you've got a treatment system and you can optimize that treatment where you can take it down to ND, great. Okay. But you never, never, never treat to action level or MCLs. You always treat to some point lower. So maybe that should answer that question.

BOWMAN: So if you had a perchlorate at 5 or something, maybe that would be --

VECCHIO: Right.

BOWMAN: -- allowable.

VECCHIO: If you have really optimized your treatment such that you haven't taken the costs that they're just so sky high, it would be acceptable. But it's not acceptable to just treat down to the action level.

ATWATER: Or to use an example, City of Pomona has a 20m ion exchange plants which (UNINTELLIGIBLE) nitrates. You allow them to blend back to 36, if I'm correct.

VECCHIO: Right.

ATWATER: So they treat nitrates and then they blend back with their other well water and they

maintain their system --

VECCHIO: That's awfully high in nitrates.

ATWATER: High in nitrates. So I use that as an example, because in theory, then, with perchlorate you could do the same thing, which would be whatever. What is that? Percentile of 18 would be -- you'd have a goal of roughly 12 or 13.

VECCHIO: Right. But the other thing, too, just let me caution you again, it's this public hearing process and whether or not the customers are willing to pay that at that level.

BURIL: Well, that's a very important point.

VECCHIO: It's a very important point.

BURIL: Because one of the things I know I personally have a goal on, and I think Pete shares this with me and I hope he kicks me under the Table if I'm not, is that when we do come to some decisions, that the group of us, purveyors, regulators, NASA, JPL, are able to present ourselves as a unified body to the public and say "This is what we think needs to be done."

ROBLES: And then if the public decides that's not acceptable, we'll all deal with it from that standpoint.

VECCHIO: Right.

ROBLES: But the first thing is to come together as a unified front. That's why we want your comments on this. This is not a process that's done in a vacuum with NASA/JPL and our contractor, Foster Wheeler doing it on its own. We need your input.

If you have any other scenarios or alternatives that you can give us, please feel free to give them to us. If you want to modify some of these, we need that. We just want to know. This is just a brainstorming. We need your inputs. And if you can think of anything else creatively that we can do, or scenarios, you know, we need your inputs on this

BURIL: But we need them quickly.

CUTLER: I was just going to say. Our schedule is rolling ahead

BURIL: This list is fairly complete in terms of trying to look at all the potentials. It gets down to a few specifics.

One of the things that would help us just tremendously, for example, if we were in a position of having to treat to below action level for perchlorate prior to reinjection and yet we haven't found a viable means of doing that, like I said

before, some of these things may drop off the Table because of the technical infeasibility. That's not saying it will. That's saying it's a potential. Continuing to invest time to evaluate that particular avenue would be useless. We can better invest our time on something else.

So if we can get input back not only from the regulatory people but from you folks with regard to what you think the feasibility of these suggestions and scenarios are -- if, for example, the Raymond Basin is going to be not particularly keen on reinjection for whatever reason. I'm not saying you are or you aren't. But you if generate a concern in that regard, we need to know fairly rapidly because that could have a major impact on what our ultimate response would be.

ROBLES: I would recommend if you call a Raymond Basin board meeting and you wanted us to come in and explain these things to the whole board so that we could facilitate a speedy response from you, we'd be willing to do that as well. I think if you feel you need to call the members and to just specifically -- we come down and talk to you, if you think that would help, that we would be -- we'd be willing to put ourselves at your disposal on that.

PALMER: We may follow up on that. But I would stress to both of you that one of the things that is going to be driver for us being unified is we are responsive to what the Regional Board requirements are and even more so to DHS.

ROBLES: Sure.

PALMER: So many of the things you're asking about I'm going to look over my shoulder and say, "Vera, are you on board on this?" Because, quite frankly, they're the ones that everybody in this room, all of the water utilities have to answer to. And that's going to be much -- I think, of the purveyor response is we want to make sure that the Regional Board is happy and certainly we want to make sure that DHS is happy with what's going on. So we're going to have to work to get it on.

ROBLES: They are major players in this as well. They're the final determination.

KWAN: Vera, the Well 52, the (UNINTELLIGIBLE) depending what our blending schemes are, what are other sources for blending are, we may turn that off in the future intermittently depending on what the other sources are available. Does that count as --

VECCHIO: Once that well goes down, it goes down. It becomes inactive.

KWAN: Even if we are doing it for -- because of our other blending schemes?

BURIL: Let's say they take it down for well maintenance.

CAJINA: That's different.

VECCHIO: That's different.

CAJINA: Let me put it this way.

VECCHIO: That's different.

CAJINA: Let me put it this way. One of the things that we're asking for right now is an upgraded blending plan that includes perchlorate in those wells that blend at Windsor Reservoir. Now, once it's devised as a blending plan that's going to make it pretty clear exactly what parameters you need and what other sources you need and up to what point Well 52 can have perchlorate. And you will still be able to reliably blend it. If the perchlorate levels of that well climb above that level that you're able to deal with by your blending plan, then the well is pretty much out of commission.

If it's operating within the blending plan, and I would think, Vera, if, for instance, they didn't have -- they couldn't run, for instance, Ventura Well today so they couldn't operate it under

the blending plan because of the loss of that source, then you're able to bring that source back. That's a different story.

VECCHIO: That's a different story.

KWAN: As long as it's within the blending plan.

CAJINA: Plan.

VECCHIO: Right. And which we have not yet gotten.

BURIL: Let me ask a question, then, just going straight to our table. We talked about having Well 52 operate at a reduced rate either through throttling back itself or through intermittent pumping to coincide with other sources.

Would either of those trigger that concern?

VECCHIO: That's a hard question to answer because we haven't gotten a blending plan yet. So we're not sure of full operation of the facility. And what the restrictions would be on the flow from the various wells and whether or not they're going to be able to meet the action level being delivered to the customers. So there is -- the blending plan has to come to us first. Then we can answer the question.

BURIL: Okay. Any other questions, comments on the list?

Okay. Again, the plea to respond as quickly as you can because it will be very beneficial to us.

It is after noon. I'm going to assume that we might want to just press on with the last item on the agenda today, which were comments from the Raymond Basin Management Board on the Operable Units 1 and 3 Remedial Investigation Report. I realized as I was coming up here that we did not get copies of all of those for folks. So I'm going to ask if Ron or Rich or someone would kind of just summarize your comments to us and then we can take the discussion from there.

ATWATER: Sure. Let me just briefly summarize. We had two key points. One is, if you look historically over the last 40 or 50 years, the Department of Water Resources, which has served as watermaster to the Raymond Basin Management Board and during their original ajudication submitted reports to the referee, the judge and all that. We've identified and showed documents where the flow from the Lab went westerly towards La Canada. And that's happened periodically over the last 50 years.

And so the statements in the draft, remedial investigation, I notice both DTSC and the EPA comments and the Regional Board, it made other comments like that, to say clearly in the report, I don't think it's technically accurate, the statements that the regional groundwater flow is from La Canada past the Lab easterly. We've got historic documents that show clearly the flow at times in the Arroyo went both directions from the mouth.

BURIL: What is the basis for that determination in those documents, Rich?

ATWATER: Water level measurements.

BURIL: Taken where?

ATWATER: I'll let Chris go back. But historically -- we'll get you that data in the reports, but those were certainly professional judgments made by a State agency, and a well-respected agency. So we think those documents certainly indicate information --

BURIL: We would be very interested in seeing the data. I think I can say safely that the data that we have give very strong indication that while water certainly does flow to the west, that it does not flow with enough force or with enough --

ATWATER: Force?

BURIL: Well, enough of a flow rate or with enough time to effect a large transport of contamination from the Lab to the west. And --

ROBLES: We'll need to see the data

BURIL: We need to see the data you folks have to make sure that conclusion we've come to --

ATWATER: In all your I haven't seen water levels or analysis that you've done previous to 1990, or very little of it, water level measurements or historic flow or modeling work has not been done. In fact, one of the things we recommended a year and a half ago is that JPL/NASA and your contractors work with Metropolitan. And if you look at the work since C H {KREUPL/} Hill, worked for the City of Pasadena, Metropolitan, that the regional groundwater model for the Raymond Basin, we ought to look at the historic calibration runs going back for the last 30, 40 years. Your small water flow model has not calibrated very well, particularly when you look at the water level measurements in the early '90s. So that's a good technical question.

We ought to go back and look at the water level measurements and historic pumping patterns for the last 50 years, because at least the reports, and

we'll show you the exhibits, clearly there's documentation that flow has gone westerly towards La Canada.

CUTLER: I think you'll see that in the report. We documented flow to the west across the site.

ATWATER: Sure. And it goes back to La Canada. And that's our point.

CUTLER: Well, I think that -- well, I don't think we need to get into it.

ATWATER: I know. There's a lot of other -- lot of other things --

BURIL: In fact, we're not going to get into it right now, folks. I'd rather just see the data and give us opportunity to see what you have.

PALMER: But I think, Chuck, it's important what you're saying in this report is your very clear implication that you have nothing to do with or that the contamination on site had nothing to do with the contamination in La Canada. And I think that we need to see that -- we also need to see your data because, quite frankly, that's --

BURIL: It's in the report.

ATWATER: No, it's not.

PALMER: Well, if you'll recall, when we were talking perchlorate your data indicated if we had a

high rainfall here in the Arroyo Seco we're going to see perchlorate numbers go through the ceiling. And actually just the opposite happened. So I think that was --

CUTLER: That wasn't in the report.

BURIL: I would ask you to point that out to me.

(MULTIPLE VOICES.)

ATWATER: But you made statements that the regional groundwater flow is -- and you have figures that say that that is -- AND that's not accurate. Nor do you have data that support that. Not over the last 50 years do you have data that support --

CUTLER: I think we do.

ATWATER: Well, show us the data, then.

CUTLER: 50 years ago, no.

ATWATER: '50s. The 1960s. The 1970s?

PALMER: Well, you have a statement in here, "The only municipal production wells with elevated cancer risk, the Valley Water Company Well Number 1, is located upgradient of JPL." That's an extremely powerful statement that you're making. And I don't know -- that well has not had -- you're saying the that well that -- with elevated risk that implies right now, and yet that well for at least the last two years has been in the 18, 20 parts of PCE. I

don't -- what is the -- on what basis is that -- is that statement made? There are wells that have been higher than that in other --

CUTLER: That data -- I think there's a little misunderstanding reading the comment in your letter. The data that was used in the risk assessment was 1997 data. So I think the maximum PCE was 38. It wasn't 110 or 107 or whatever it was.

ATWATER: So the only period of records you're using is 1997?

CUTLER: This was directed by EPA risk assessors. They wanted recent data. They wanted an average over a year. That was the most recent year of RI data.

We actually went around with EPA quite a bit on representing risks that way. So it was directed from the agencies to use untreated water at each well for just -- you have to assume the worst case situation in CERCLA.

ROBLES: That was the direction.

CUTLER: We tried to make it very clear throughout the document that this is untreated water, there is no risk to consumers, water is being treated to meet very strict standards.

ATWATER: The summary and conclusions doesn't

state that. We talked about this last week. But we'd be happy to go through the report.

You don't acknowledge that wellhead treatment is occurring at Lincoln, at Valley, at Pasadena and that they, for the last 20 years, have always complied with the MCLs and with regards to VOCs.

CUTLER: We do say "wellhead treatment by the water purveyors." We may not specifically state it the way you had said.

PALMER: But specifically in that -- those two sentences they just stop there. Now, if I'm a member of the public reading this, the only municipal production well with elevated cancer risk is Valley Water Company Well Number 1.

ATWATER: That implies --

PALMER: (UNINTELLIGIBLE) saying that that well has never been turned into the system, that it's been below -- it's been ND on VOCs every test for what goes into the system. That doesn't say that. Alls it says is that that's a bad well.

ATWATER: It implies that the public --

PALMER: If I'm a member of the public and I read that --

CUTLER: I understand what you're saying.

RIPPERDA: You might have to go through the whole risk assessment section and put in the phrase on every single mention of every single well that "This well has treatment -- "

ATWATER: More importantly --

(MULTIPLE VOICES.)

ATWATER: Either the executive summary or the summary -- or the conclusions.

CUTLER: My point is --

ATWATER: None of that is stated in those two sections.

CUTLER: -- we didn't intend for that to come across. That's an easy fix.

PALMER: The five people that read this had the same reaction to me, that wholly mackerel, what's the -- that well is a direct -- today that's what it says.

CUTLER: That was not intended

BURIL: That was not the intent, as obviously there is no true risk to anyone. And so we can make that modification to be sure that that is rectified.

VOICE: (UNINTELLIGIBLE)

BURIL: But recognize that the calculation that was part of this, that was basically told to us to do was the genesis of that statement. It's not

meant to imply that this is an actual risk. It's a calculated risk calculated through the appropriate protocols agreed to by the EPA and the DTSC. The fact that it has no bearing to what people truly get out of their wells or out of their by tap is not what the EPA is concerned with or the DTSC. They wanted to see that theoretical maximum risk. And that's what we reported.

PALMER: Then, let me direct to Mark. I would appreciate it you would look at that policy as far as -- I understand that. I understand that completely. But I also think -- I want the EPA to understand this is a document that's going to be made available to the public. And I think it's equally important that what you say in here is not alarming -- is neither alarming nor untrue.

In the case of that well Valley come unglued. They are upset because for the money they have spent and the work they have gone through to assure that they were nowhere near -- if what you said there, DHS would have been all over them. And they've never even come close to the MCL.

RIPPERDA: JPL said almost exactly the same thing as you about EPA's policy, that you have to evaluate the raw water. And JPL said "We don't want

to talk about risk. Because it gets treated." Well, you have to -- so we actually made them do that.

PALMER: Okay.

RIPPERDA: But your concerns are well founded and I think Mark won't have any problem fixing the document so that every reference clearly states that it is treated.

CUTLER: We're sorry that happened. That was not what --

PALMER: This is strictly draft. Correct? This is on a limited distribution.

RIPPERDA: Yeah, that's a draft.

ATWATER: All you need to do, then, is just clarify. You can do that calculation using '97 data. If I understand it, you're taking the raw water at each municipal well and then calculating a theoretical worst case cancer risk based upon each of the wells highest concentration sample, or an average for the year?

CUTLER: It's an average. It's a 95 percent upper confidence limit average. It's a very conservative, weighted high. If that was above a above a maximum, then a maximum was used.

ATWATER: I'm curious why the arithmetic -- why

that well was used at a higher risk than some of the other municipal wells.

CUTLER: We need to go through the data. It's just the numbers.

PALMER: I suggest you look at '98. If '97 was -- and your request was the most current data. I think you ought to take a look at 1998. That would be a reasonable -- if this is to be representative of the most current data available, I'd like to --

CUTLER: At the time that we did it --

PALMER: I understand. Oh, I'm not criticizing. But I'm saying that might be worth looking into that --

CUTLER: Sure. Sure.

PALMER: -- to reflect the most recent concentrations

BURIL: Okay.

VECCHIO: Chuck, can we get a copy of your RI results, water quality results, the RI wells?

BURIL: From which report?

VECCHIO: I don't know what report because I have no idea what you guys have done.

BURIL: We've a draft-final remedial investigation report that's out there and we have

our quarterly monitoring reports.

VECCHIO: We'; d like to look a look at the monitoring data, specifically because I noticed that you got 60 VOC, 65 SVOCs, 19 metals: You show perchlorate, cyanide, tri --

BURIL: Tributyl tin.

VECCHIO: Yeah. Petroleum hydrocarbons gross, alpha plus beta, ta-da, ta-da. Okay. There's only three exceeding the State and federal MCLs. We need to take a look at what other constituents are there that may not be exceeding MCLs, because these may become items that will exceed MCLs. So that's one of the reasons we need to look at the water quality data

BURIL: I think we can arrange that. Pete is nodding his head in agreement.

ROBLES: Yes. Yes.

VECCHIO: Great. Thank you.

ATWATER: In the -- in the -- in the remedial investigation, when I read it I thought you were just summarizing all of your intentions of honoring in the data, it's from 1994 to 1998, with your correlated reports. That's the focus of the database in the report. Am I correct?

BURIL: Yes.

ATWATER: But then there's one special calculation you just took the data from '97 to do a risk assessments calculation?

CUTLER: I think we only had one quarter into '98 for the RI report. And I think the idea was --

ATWATER: So it's '94 through the first quarter of '98

BURIL: Basically it's to block it off. Since we got to write the report, we're going to be generating more and more data. We'll look at this set. And that was the set that came through.

CUTLER: It's all kind of spelled out in the report, actually, in the risk assessment section. I think (UNINTELLIGIBLE) we probably didn't get it (UNINTELLIGIBLE) that we should have.

Once again, we're sorry about that. Tell the Valley guys we're --.

But getting back to the -- I think the reason 1997 was picked, because that was a complete year when you have high water, low water periods of time and it represented maybe a seasonal temporal representation.

ATWATER: But let me ask Chuck since Vera asked the question. Is there any source or anyplace where you can get all of the monitoring data at the Lab

from when we first found VOCs in 1980 to date? Is there any --

BURIL: I believe it's in the RI.

ATWATER: At least I didn't see it in there. All I saw was the '94 through '98 data. You have bits and pieces of the production data at the municipal wells.

CUTLER: All of the data that we have collected at the site is in there. It's probably in Section 1. the previous investigation before the RI started. I I think it's like an 18-page table. It's in Section 1 and it has all the VOC data, JPL. I think it goes back to 1990, when the first monitoring wells were installed on site. We went back I believe to 19 -- maybe it was 1990 or '89 with water purveyor data.

BOMAN: The purveyor has good data from 1980

BURIL: Let's be sure we understand the purpose of our remedial investigation report. The remedial investigation report is designed to provide enough information to determine what you need to do now to remediate a site. In trying to understand what is happening now, some understanding of what happened -- how it happened is useful. But it's not meant to be a detailed review of everything that went on prior to the time that you begin to

investigate. It's meant to be able to establish the conditions as they stand now so that you can determine what to do about it. That's the focus of this report.

We aren't focusing back on things before 1980 because, frankly, we don't have enough data to really make any kind of call that would be useful to us in a feasibility study, and it doesn't serve the feasibility study per se because that's 20 years ago as opposed to now.

So as far as the kind of analysis that might go on as far as what happened before, it may not even be germane to the issue that we're trying to deal with, and that is what do we do now about the situation.

ATWATER: That's not my question, Chuck. The question isn't what the remedial investigation report ought to cover. Do we have, electronically or paper, an archive of all of the data, monitoring data from wells in the --

BURIL: Oh, yeah.

ATWATER: -- vicinity?

BURIL: Oh. In the vicinity? You mean production wells?

ATWATER: True

BURIL: That I don't know.

ATWATER: As Brad just said, City of Pasadena or Lincoln or Valley have in their files all of their DHS, the old monitoring results, et cetera, historically. And I just -- it would be nice to have all that database some way archived electronically, ideally, so that everybody in the future when you ask questions like Vera, "Well, have you ever seen --" something, or "Did we ever sample for that and did it show up at a Lincoln or Valley well in the last 20 years." It would be nice to --

BURIL: We'll take that into consideration. Sure.

ATWATER: You know, in the database it would be nice to have that electronically archived.

VECCHIO: We have that database, by the way.

BURIL: I was going to say --

CAJINA: '84.

VECCHIO: To '84

RIPPERDA: This isn't actually something that's any number you need, these two State guys have brought up. I've been on this project and it always happens DHS has the data in every single meeting. You say "Oh. Well, we'll try and get that." And like every single meeting it's like "Oh,

incompatible database, or we couldn't get hold of them." So if you're going to do it I'd like to see it, do it.

CUTLER: That's what we used for the RI report. We did get the DHS database.

VECCHIO: Did you get it on the CD from Sacramento or something?

CUTLER: I think we got hard copy.

VECCHIO: Did you?

CUTLER: At what point when we needed it I think they were down for Y2K repairs, so it took us quite a while at the time. It took us a long time

BURIL: So to answer your question, Rich, look at the data that's in the RI because I believe that it's there.

ATWATER: Good

BURIL: And if it's not, then it's something we can deal with. But --

ATWATER: Mark said back to '89, '90. As far as the report itself, you have it. Previous to '89 or '90.

CUTLER: Let me just clarify. Just a detail. We went back with the DHS, I believe to '94. Whenever we started our table to '94, that data from the water purveyors from EPA's subcontractor at the

time, URS.

RIPPERDA: Yeah.

CUTLER: So I'm not sure where he got the data. He had given Chuck a diskette. Chuck give us the diskette. Just to make it clear, from wherever -- our table begins from 1984 -- no. '94 came from EPA. From '94 on it was straight from DHS database.

ATWATER: That was that activity that we were coordinating with you on how to get all the purveyor data over the recent past.

BURIL: And that data is in there.

ATWATER: Good

BURIL: Okay. Does that cover the comments, Ron?

PALMER: I think at this point they do. I know Chris Nagler has done some analyses. One of the things we would like to get from you fellows that view this, we have some concerns now about perchlorate that was moving over toward La Canada. I know this is a contention point. But we need to work with you maybe to coordinate some well water measurements on the same day that we're doing them in La Canada and Altadena to try to get some -- maybe some key points on sites that way, Chris might be able to do that.

CUTLER: Do you measure water levels?

NAGLER: Well, the purveyors do it each month. But we do a regional static level twice a year. When I looked at your chart, that March 12, 1998, you had some measurements. And so I quickly looked at what I had and that's (UNINTELLIGIBLE) But I think if we're going to have water level measurements we should coordinate the whole region so we can, you know, have consistent data.

CUTLER: Just so you're aware, I think it's spelled out in the report. We have basically daily water level measurements since, I think, 1992 from this site

BURIL: We have so much water level data, Chris, we couldn't throw it all away. It would fill all our dumpsters.

PALMER: I'll take it. Where is it?

CUTLER: It's a topic that we're trying to reduce that amount.

NAGLER: I think since we do this twice, and right now I'm making a graph for the annual report. And, you know, there's a void because I don't have any -- right now I don't have the JPL data. So if I give Ron a particular date, you know, that we did our measurements, then at least that portion through

JPL can be consistent, because right now I ignore anything in that area.

ROBLES: Where is it located?

BURIL: Where is it at? We have it on database, don't we? Yeah.

PALMER: It's not in the CDs that came with the --

BURIL: No. That was far more extensive than the purposes we needed for the RI.

CUTLER: At one point we were taking it four times a day

BURIL: We have huge amounts of data.

VECCHIO: Does this report speculate the maximum concentrations that are to be expected for each one of these constituents?

ROBLES: I don't think so.

RIPPERDA: The maximum at like a Pasadena water well or maximum on site?

VECCHIO: Yeah. Yeah, because basically the treatment systems have to be designed for whatever the maximum levels would be.

CAJINA: That's part of the source characterization.

VECCHIO: Yes.

CAJINA: We want to know not just what's there

but like we were saying, what's expected. Not just in terms of different contaminants, but if we can reasonably expect a concentration of something higher, obviously it's in everybody's interest to design for that.

CARLOS: I have a question for Mark. About the data logger that NASA is requesting that they don't replace, instead they will take manual measurements. The multi-depth monitoring wells will continue to collect water level elevations single (UNINTELLIGIBLE)

BURIL: No, they don't use (UNINTELLIGIBLE)

CUTLER: It's different equipment. The West Bay wells, it's a specialized construction. And the sampler probe has a transducer built into it. You (UNINTELLIGIBLE) into an individual screen involved and you activate the lever and you get contact with the (UNINTELLIGIBLE) the pressure transducer is built into that tool. So you could take that and convert it into an elevation or a hydraulic head at that point(UNINTELLIGIBLE).

The shallow wells have just a regular pressure transducer with a little computer data logger. Since we've been doing this since 1992 these things are pretty much breaking down, falling

apart. And so it's come up, the RI is basically over. We put in a request can we now just do manual and monthly water level measurements in our shallow wells to coincide with the monthly pressure transducer readings in the multi-port wells instead of doing monthly in the deep wells and daily everywhere else. Just a request. So it's different equipment.

CARLOS: I was looking more of how comparable the data.

CUTLER: It's not really comparable. The only comparable is the upper screen in the multi-port wells is a water table. And that goes with the shallow water table.

CARLOS: But the rest of the multi-depth wells won't be?

CUTLER: No. That's just for vertical flow. We don't use that for water table

BURIL: All right. Anybody have anything else they'd like to throw on the table as far as these agenda items? I think we've given you enough to think about for a little bit and hope to hear back from all of you with regard to what you think about these alternatives. And we'll be talking with you.

PALMER: Is there going to be any public hearing

or any more outreach to the public on this process?

VECCHIO: We would hope so.

PALMER: It seems to me that's lacking. I don't know.

BURIL: It's not planned at this point in time, but that's something that we're trying to build into the schedule. What we're trying to do is --

GEBERT: I thought it was planned to do a fact sheet.

BURIL: Oh, yeah. The fact sheet is actually in the last stages. So, yeah, we've got a fact sheet coming out talking about this.

VECCHIO: Chuck, what does it take to -- do we -- is the quality water data large volumes of data, or --

BURIL: It's huge.

VECCHIO: So we could come look at it

BURIL: It's huge. I'd be happy to send you copies of the reports, but they'll stand as high as you are.

VECCHIO: No. No. We would prefer to come look at them

BURIL: Okay. We can try to arrange that. Give my office a call.

RIPPERDA: How tough is it for DHS to get them a

list of chemicals so they can start scheduling their raw water characterization?

VECCHIO: I'm sorry?

RIPPERDA: What's the time frame for getting them a list of chemicals so they can start their raw water characterization or a line of what goes into a raw water characterization?

VECCHIO: Probably the first week in August, because we're pretty well tied up.

BURIL: That's only 10 days.

RIPPERDA: That's pretty close

BURIL: Scared to think summer is almost over, isn't it?

Well, okay. Thank you all very much. Appreciate it.

(The proceedings adjourned at 12:45 p.m.)

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July 20, 1999

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